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## Sixth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

### Gas Turbine Technology

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

#### Module-1

- 1 a. Illustrate and describe the comparison of operating parameters of Turbojet, Turboprop and Turbofan engines. (10 Marks)
- b. Draw and explain the working principle, advantages and disadvantages of following engines:
  - (i) Turbojet engines.
  - (ii) Turbofan engines. (10 Marks)

**OR**

- 2 a. List the basic types of burners system used in gas turbine engines and discuss the importance of each type with a neat sketch. (10 Marks)
- b. How do you understand the term 'Thrust Augmentation'? How it helps the aircraft and discuss its methods. (10 Marks)

#### Module-2

- 3 a. Why Gas Turbine engine needs special care in selecting materials for its manufacturing? Discuss the characteristics for selection of metal for Gas Turbine engine. (10 Marks)
- b. Discuss the importance and methods used for surface Finishing Techniques in Gas Turbine engine components. (10 Marks)

**OR**

- 4 a. Draw and explain the components of Typical Fuel systems used in gas turbine engine. (10 Marks)
- b. Discuss the steps involved in starting process of Jet engine with necessary sketch and explain various form of Gas Turbine starters. (10 Marks)

#### Module-3

- 5 a. What is Wind milling? Explain the effects of Wind milling in gas turbine engines. (10 Marks)
- b. Elaborate about engine performance monitoring and its importance in aviation industry. Discuss the latest techniques used in engine performance monitoring. (10 Marks)

**OR**

- 6 a. The following datas are observed in a flight for a Turbojet engine :  
 RPM = 9465, EGT = 510 °C, TSFC = 0.4,  $W_a = 90.7 \text{ kg/s}$ ,  $W_f = 1814.4 \text{ kg/h}$ ,  $F_n = 4536 \text{ kg}$ ,  
 Barometric pressure = 102.6 kPa, Ambient Temp = 27 °C. Correct the engine performance to the standard day conditions of 101.3 KPa and 15 °C. (10 Marks)
- b. Discuss in detail about design point performance parameters for a gas turbine engine. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. Draw and explain the Compressor MAP. Also, explain the working of Compressor Rig Test. (10 Marks)  
b. Discuss the Importance parameters for combustor-off design performance. (10 Marks)

**OR**

- 8 a. Draw and explain the Turbine MAP and its Impact. (10 Marks)  
b. Discuss the After burners operation and its off-design performance. (10 Marks)

**Module-5**

- 9 a. Discuss the following Engine Testing methods:  
(i) Preliminary Flight Rasing Test.  
(ii) Qualification Test  
(iii) Acceptance Test.. (12 Marks)  
b. Draw and explain MASS and CUSUM plots and its applications in Gas Turbine Testing. (08 Marks)

**OR**

- 10 a. Draw and explain the process of Data acquisition system and its uses. (10 Marks)  
b. Discuss the following test methods :  
(i) Altitude Test Facility  
(ii) Flying Test Bed. (10 Marks)

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